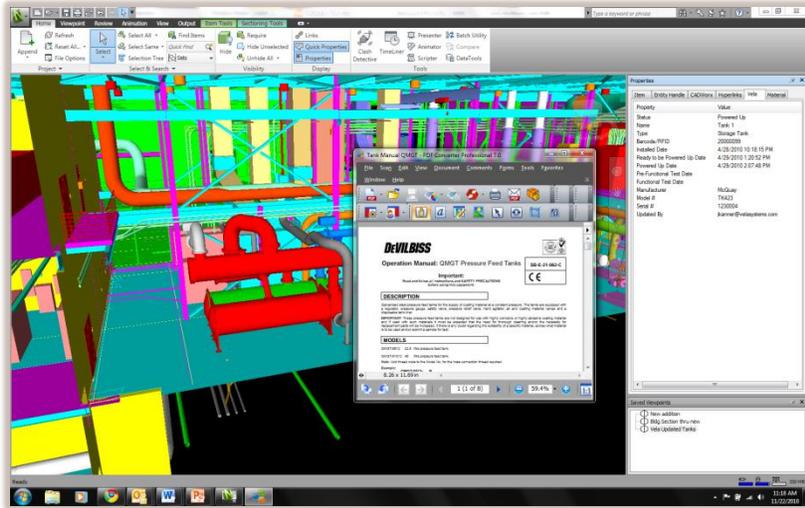




OWNER BENEFITS OF FIELD BIM® FOR COMMISSIONING & HANDOVER

OVERVIEW

Traditionally, using paper-based or electronic file-driven processes, owners, operators and facilities managers suffered a critical loss of knowledge from the construction and commissioning phases on to the operations and maintenance phases at the time of handover, turnover and substantial completion. Now, using Vela Systems field management software and cloud-based database with BIM tools such as Autodesk Navisworks® or Tekla for CM® a combination called Field BIM®, project teams are managing information and creating value during construction and commissioning for handover as a digital asset for ongoing operation. This document highlights some of the key benefits realized by projects that have implemented this solution and presents research data on the magnitude of the opportunity for the industry as a whole.



The benefits of Field BIM® were so significant that we have undertaken a 3 year plan to model all of our existing facilities at a multi-million dollar cost. Director Facility Operations, Hospital

BENEFITS TO OWNERS, OPERATORS AND FACILITIES MANAGERS

- **Commissioning & Handover Benefits**
 - Accurate information from the point of construction captured and managed in Vela’s field management software, which can be tied to barcodes on the specific equipment
 - A “usable” handover deliverable (i.e., no more “piles of paper or CDs”) – during and after construction by leveraging Vela and Navisworks to navigate key data and documents
 - Data transfer to facility management systems immediately, not months or years, by leveraging Vela’s flexible data templates
 - Avoidance of expensive and time-consuming post-construction as-built data capture on systems and equipment

- **Operations & Maintenance Benefits**
 - Improved efficiency: Finding information and documents needed to do maintenance saves hours on each work ticket
 - Reduced errors in the field: Operators and facilities managers can access information and key documents, such as O&M manuals, and drawings in the field



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- Better energy efficiency as reliable baseline data on systems and equipment results in better systems management over time – owners know “are systems staying on track or not?”
- Better service management from accurate inventory of equipment, accurate warranty start dates and warranty guarantors
- More widespread use of BIM as facility and operations teams can update data and documents back to BIM tools like Navisworks using Vela

SELECTED CUSTOMER TESTIMONIALS FROM OWNERS ON FIELD BIM FOR COMMISSIONING & HANDOVER

- *"We had a \$150,000 outage that would have been avoided if we had the system."*
- *"We went from 4-6 months to 4 days to get our facility up and running because the data was available in a structured way."*
 - Michael Plank, Director Facility Operations, Maryland General Hospital
- *"We got a usable handover deliverable, instead of a pile of paper or pile of CDs and are able to have a visual way to organize information, now it isn't just in one person's head."*
- *"We want our staff to be able to access data and documents and also keep the model updated over time".*
 - Paul Hanbury, PE, Senior Mechanical Project Manager, U. of Massachusetts Medical School
- *"There's no question that BIM has helped us to save money on construction costs, and we expect it will help with training operators and maintenance personnel in our facility in the future..."*
 - Bill Mcnab, Project Manager, Severstal Dearborn steel manufacturing plant

Selected Vela Systems Field BIM® Projects

Owner	Contractor/CM Firm(s)	Project Type
Autodesk	Tocci	Commercial Office Space
Life Care Services (LCS)	Weitz	Assisted Living Facility
Maryland General Hospital	Barton Malow	Hospital Renovation/Addition
N.C. State	Skanska	Library
Severstal Dearborn	Barton Malow	Manufacturing Plant
University Health Systems	Zachry - Vaughn – Layton	Hospital Addition
U. Mass Medical School	Skanska	Co-Generation Facility



SELECTED INDUSTRY DATA ON THE VALUE OF FIELD BIM FOR COMMISSIONING, HANDOVER, & OPERATIONS

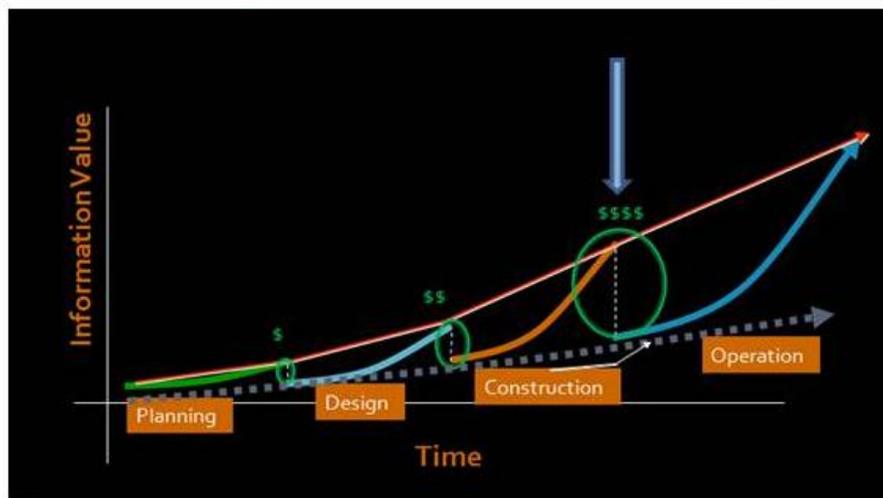
Numerous government and private sector studies have been completed on the value of information flow at various stages of design, construction, handover and operations processes. A review of these efforts reveals some interesting similarities:

- 1. The most valuable information transfer happens at handover to the owner – this is due to the importance of the facility information in the operations of the building, which is 85% of the total lifetime cost of the building**

NIST and FIATECH found that “although design, construction and commissioning activities are completed within a few years, the facility life cycle may extend over decades or even centuries. Thus, the operations and maintenance phase is the longest and the most costly. Therefore, it is the life cycle phase that would benefit most from information handovers in structured form.” With more quantitative data, “The highest costs were incurred by owners and operators (OOs), and 85 % of those costs were incurred during operations and maintenance. The major cost was time spent finding and verifying facility and project information.”¹

This concept is also shown in various forms of “sawtooth” and other “information loss” graphics, here Birgitta Foster, Sandia National Labs, shows “Information Value” and loss across planning, design, construction, and operations, with the greatest loss (blue arrow) at construction to operations.

BIM : Closing the Information Gap



From: BIM After Construction, Birgitta Foster, Sandia National Labs, 2010

- 2. Today, owners are spending considerable resources bridging this information gap either during the handover phase, or in an ad-hoc manner by facilities teams during operations**

The National Institute of Standards and Technology (NIST) study Cost Analysis of Inadequate Interoperability in the U.S. Capital Facilities Industry (NIST GCR 04-867) makes clear that all stakeholders



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in the capital facilities industry – designers, contractors, product suppliers and owners – are wasting a huge amount of money looking for, validating and/or recreating facility information that should be readily available at handover. *For example, the study estimated that operations and maintenance personnel spent US \$4.8 billion during 2002, verifying that documentation accurately represented existing conditions, and another US \$613 million transferring that information into a useful format.*ⁱⁱ

Other studies have focused on the elimination of the delay and cost involved in populating a facility management (FM) system. **One healthcare study found that a typical hospital required as much as 6-12 months and more than £200,000.**ⁱⁱⁱ This is borne out by anecdotal information from numerous owners (e.g., “It usually takes me 12 months or more to get my facility information into my CMMS system after completing a construction or renovation project”).

The result of this poor organization has also been measured. Some owners are taking an “ad hoc” approach of by looking for information as it is needed. Birgitta Foster, Sandia National Labs showed that the facilities team is today spending up to 2 hours/work order (WO) to find the relevant information needed to complete facility operations tasks. **By having this data and documents readily available, the Sandia Labs could save up to \$2.4MM/year** (up to 2 hrs x \$50/hr x 24,000 WOs = \$2.4MM).^{iv}

SUMMARY

- Vela Systems has created a solution for BIM-based commissioning, handover and operations
- Case studies have demonstrated significant value to the owner across many project types
- These results jibe with industry research – owners bear the cost of poor information flow at handover and during subsequent operations which is 85% of the cost of a building
- Research shows that as owners move to BIM-enabled commissioning, handover and operations, the value is in the billions of \$USD

For more information: Visit <http://www.velasystems.com/products/commissioning/>

REFERENCES

ⁱ Fallon, Kristine K. and Mark E. Palmer in cooperation with FIATECH and USPI-NL. The Capital Facilities Information Handover Guide, Part 1 (NISTIR 7259). January 2006. This figure excludes the losses for residential facilities and transportation infrastructure.

ⁱⁱ The National 3D-4D-BIM Program, Office of Design and Construction, Public Buildings Service, U.S. General Services Administration. GSA Building Information Modeling Guide Series: 08 – GSA BIM Guide for Facility Management. Washington, D.C., 2010.

ⁱⁱⁱ Kristine K. Fallon and Mark E. Palmer. NISTIR 7417, General Buildings Information Handover Guide: Principles, Methodology and Case Studies. NIST National Institute of Standards and Technology, U.S. Department of Commerce, FIATECH: Washington, D.C., 2007. 7-8.

^{iv} Birgitta Foster, *Bim After Construction*, AGC Winter BIMForum, 2010, <http://www.slideshare.net/KurtvonAhnen/winter-bim-forum-bim-after-construction-final>